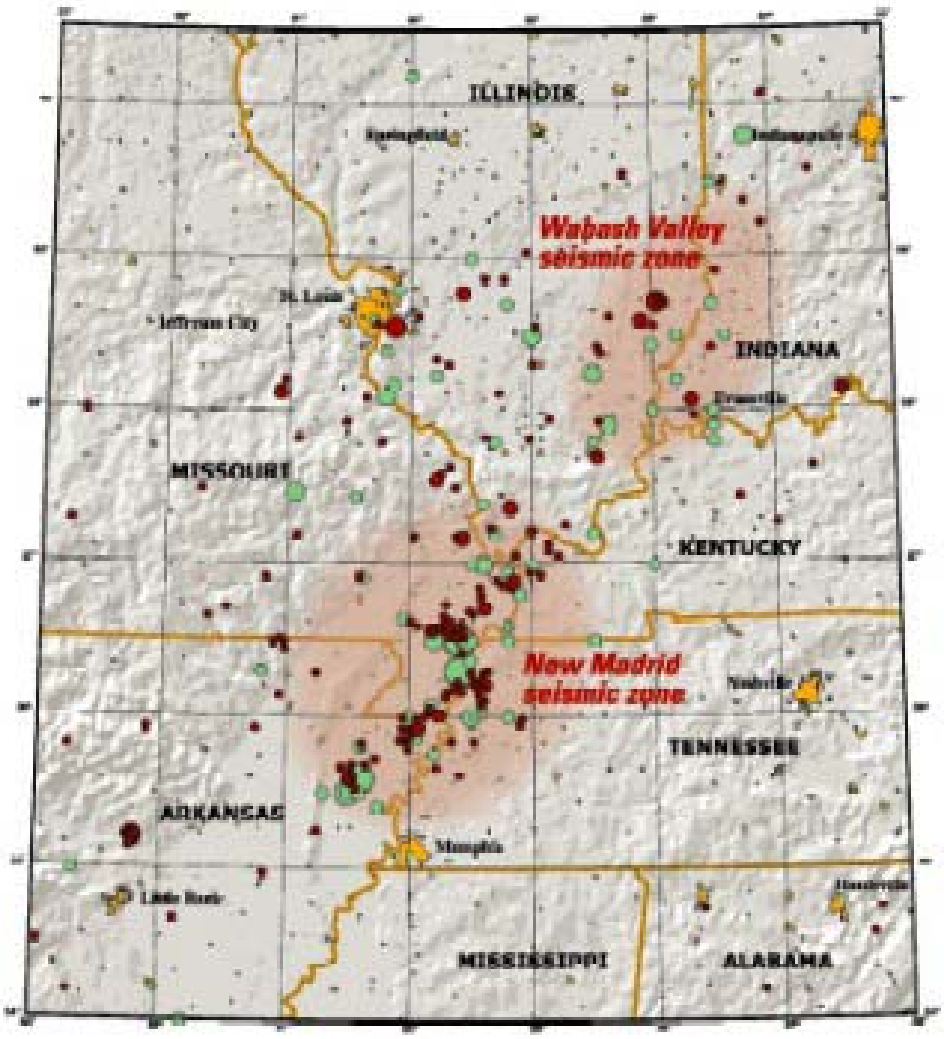
Central United States Earthquake Hazards Program

Earthquake Information for the Media



General Information Product 0000

The above map from USGS of the New Madrid and Wabash Valley seismic zones shows earthquakes as circles. Red circles indicate earthquakes that occurred from 1974 to 2002 with magnitudes larger than 2.5 located using modern instruments (University of Memphis). Green circles denote earthquakes that occurred prior to 1974 (USGS Professional Paper 1527). Larger earthquakes are represented by larger circles.

Earthquake Information for the Media

This media kit is a courtesy of the emergency management agencies and geological surveys in the Central United States.

Table of Contents

Background Information About the National Earthquake Hazards Reduction Program

NEHRP Overview

From the NEHRP Website

The United States Congress established the *National Earthquake Hazards Reduction Program (NEHRP)* when it passed the Earthquake Hazards Reduction Act of 1977, Public Law (PL) 95–124. NEHRP's stated purpose was "to reduce the risks of life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program." The motivation to create a National Earthquake Hazards Reduction Program was the result of the devastating 1964 Alaska and 1971 San Fernando earthquakes. These two quakes caused severe damage and cost the country significant financial losses. This rekindled a growing concern in which congress recognized that earthquake-related losses could be reduced through improved design and construction methods and practices, land use controls and redevelopment, prediction techniques and early-warning systems, coordinated emergency preparedness plans, and public education and involvement programs. Since its creation, NEHRP has become the Federal government's coordinated long-term nationwide program to reduce risks to life and property in the United States that result from earthquakes. Since 1977, congress has periodically reviewed and reauthorized NEHRP (1980, 1981, 1983, 1984, 1985, 1988, 1990, 1994, 1997, 2000, and 2004.) Changes have occurred in program details in some of the reauthorizations. However, the four basic NEHRP goals remain unchanged:

- Develop effective practices and policies for earthquake loss reduction and accelerate their implementation.
- Improve techniques for reducing earthquake vulnerabilities of facilities and systems.
- Improve earthquake hazards identification and risk assessment methods, and their use.
- Improve the understanding of earthquakes and their effects.

In its initial NEHRP authorization in 1977, and in subsequent reauthorizations, congress has recognized that several key Federal agencies can contribute to earthquake mitigation efforts. Today, there are four primary NEHRP agencies:

- Federal Emergency Management Agency (FEMA) of the Department of Homeland Security
- National Institute of Standards and Technology (NIST) of the Department of Commerce (NIST is the lead NEHRP agency)
- National Science Foundation (NSF)
- United States Geological Survey (USGS) of the Department of the Interior

For more information about NEHRP and its four lead agencies visit http://www.nehrp.gov/

New Madrid & Wabash Valley Earthquake History

New Madrid Seismic Zone

The 400 terrified residents in the town of New Madrid (Missouri) were abruptly awakened by violent shaking and a tremendous roar. It was December 16, 1811, and a powerful earthquake had just struck. This was the first of three large (magnitude 7.2 - 8.0) earthquakes and thousands of aftershocks to rock the region that winter.

Survivors reported that the earthquakes caused cracks to open in the earth's surface, the ground to roll in visible waves, and large areas of land to sink or rise. The crew of the New Orleans (the first steamboat on the Mississippi, which was on her maiden voyage) reported mooring to an island only to awake in the morning and find that the island had disappeared below the waters of the Mississippi River. Damage was reported as far away as Charleston, South Carolina, and Washington, D.C.

These dramatic accounts clearly show that destructive earthquakes do not happen only in the western United States. In the past 20 years, scientists have learned that strong earthquakes in the central Mississippi Valley are not freak events but have occurred repeatedly in the geologic past. The area of major earthquake activity also has frequent minor shocks and is known as the *New Madrid Seismic Zone (NMSZ)*.

Earthquakes in the central or eastern United States effect much larger areas than earthquakes of similar magnitude in the western United States. For example, the San Francisco, California, earthquake of 1906 (magnitude 7.8) was felt 350 miles away in the middle of Nevada, whereas the New Madrid earthquake of December 1811 rang church bells in Boston, Massachusetts, 1,000 miles away. Differences in geology east and west of the Rocky Mountains cause this strong contrast.

The loss of life and destruction in recent earthquakes of only moderate magnitude (for example, 33 lives and $20 billion in the 1994 magnitude-6.7 Northridge, California, earthquake and 5,500 lives and $100 billion in the 1995 magnitude-6.9 Kobe, Japan, earthquake) dramatically emphasize the need for residents of the Mississippi Valley to prepare further for an earthquake of such magnitude. Earthquakes of moderate magnitude occur much more frequently than powerful earthquakes of magnitude 7 to 8; the probability of a moderate earthquake occurring in the New Madrid Seismic Zone in the near future is high. Scientists estimate that the probability of a magnitude 6.0 or larger earthquake occurring in this seismic zone within a 50 year period is 25% to 40%. Such an earthquake could hit the Mississippi Valley at any time.

In 1811, the central Mississippi Valley was sparsely populated. Today, the region is home to millions of people, including those in the cities of St. Louis, Missouri, and Memphis, Tennessee. Adding to the danger, most structures in the region were not built to withstand earthquake shaking, as they have been in more seismically active areas like California. Moreover; earthquake preparations also have lagged far behind.

New Madrid Seismic Zone continued on page 6

New Madrid & Wabash Valley Earthquake History

New Madrid Seismic Zone continued from page 5

Recognizing these problems, the U.S. Geological Survey (USGS) and other organizations are joining in actions that will greatly reduce loss of life and property in future temblors:

In 1983, with funding support and in partnership with the Federal Emergency Management Agency, the states of Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee formed the Central United States Earthquake Consortium (CUSEC).

CUSEC improves public earth-quake awareness and education; coordinates multi-state planning for earthquake preparedness, response, and recovery; and encourages research in earthquake hazard reduction.

In the 1990's, the USGS, advised by private, academic, and government experts, issued a plan for intensified study of the New Madrid seismic zone. At the same time, the National Earthquake Hazards Reduction Program expanded efforts in the central United States. Earthquake education is now part of the curriculum in the schools of many CUSEC states. In Kentucky, the state legislature has mandated that earthquake education be taught in schools.
Earthquake Awareness Weeks have been held in Missouri and Kentucky for several years, and other CUSEC states are having annual awareness campaigns as well.

Volunteer earthquake advisory councils or similar organizations have been formed in most CUSEC states.

In 1993, with USGS support and collaboration, the CUSEC State Geologists began a significant effort to map earthquake hazards. In 1995 they completed a regional soils map that can be used to locate areas likely to experience intense shaking in earthquakes. This was revised in 1999. In 2003-2004, the CUSEC State Geologists worked with the USGS to create an informative map, showing three centuries of significant earthquakes in the Central US.

More CUSEC states and local jurisdictions are adopting building codes containing the most up to date earth-quake design standards.
Efforts to ensure the seismic safety of critical structures, such as dams, bridges, and highways, have accelerated. For example, transportation agencies in Illinois, Kentucky and Tennessee initiated programs to strengthen highway bridges that do not meet earthquake design standards. The I-40 Bridge over the Mississippi River in Memphis, Tennessee has been retrofitted to withstand large, damaging earthquakes.

Strong earthquakes in the New Madrid Seismic Zone are certain to occur in the future. In contrast to the western United States the causes and effects of earthquakes in the central and eastern United States are just beginning to be understood. Through better understanding of earthquake hazards and through public education, earth scientists and engineers are helping to protect the citizens of all parts the United States from loss of life and property in future earthquakes.

Wabash Valley Seismic Zone on page 7

New Madrid & Wabash Valley Earthquake History

Wabash Valley Seismic Zone

Recent studies have indicated that the New Madrid Seismic Zone is not the only 'hot spot' for earthquakes in the Central United States.

On June 18, 2002, a 5.0 magnitude earthquake struck the Evansville, Indiana with an epicenter between Mt. Vernon and West Franklin in Posey County, in an area that is part of the Wabash Valley Seismic Zone. According to the Indiana University Indiana Geological Survey, while there was minor damage associated with the earthquake, the tremor was a warning to residents of the Wabash Valley Seismic Zone that earthquakes can, and do, strike close to home.

The Wabash Valley Seismic Zone is located in Southeastern Illinois and Southwestern Indiana and it *is* capable of producing 'New Madrid' size earthquake events. Since the discovery of this seismic zone, earthquake awareness and preparedness have increased. Residents are seeing that moderate sized earthquakes are not just occurring to the south, but occur right at home and can affect Illinois, Indiana and Kentucky.

Geologists in Indiana and Illinois have found liquefaction sites and sand dikes that shows the evidence of prehistoric earthquakes in the region. By examining the size of the dikes and sediment found within the sand dikes, geologists are able to estimate the size of the earthquake it took to create the formations. In the mid-1980's, geologist Steven Obermeier found a liquefaction formation that was estimated, through carbon dating, to be 6,100 years old. The earthquake that produced the site was estimated to be a magnitude 7.0, large enough to seriously disrupt the area known as the Wabash Valley Seismic Zone.

Current research is still turning out new evidence of historic earthquakes in the zone.

Earthquake Information Online

Earthquake Notification Services

Subscribe to the earthquake notification service and you will automatically receive information from the USGS about significant earthquakes. The information will include magnitude, location and time of the earthquake. Some notification options will include a Shake Map, if one is available, and a URL for additional information.

Subscribe at:
https://sslearthquake.usgs.gov/eqcenter/ens/

Real-Time Earthquake Information

For Newsworthy Earthquakes
http://earthquake.usgs.gov/

For Real-Time U.S. Earthquakes and Earthquake Maps
http://earthquake.usgs.gov/eqcenter/recenteqsus/
http://folkworm.ceri.memphis.edu/recenteqs/Maps/88-35.html

Report an Earthquake and View Shake Maps at Did You Feel It?
http://earthquake.usgs.gov/eqcenter/dyfi.php

Other Earthquake Information

Historic USA Earthquakes
http://earthquake.usgs.gov/eqcenter/historic_eqs.php

Frequently Asked Questions About Earthquakes
http://earthquake.usgs.gov/learning/faq.php

Earthquake for Kids
http://earthquake.usgs.gov/learning/kids/

Earthquake Preparedness
http://earthquake.usgs.gov/learning/preparedness.php

Earthquake Media Contact Information

FEMA Headquarters

FEMA 500 C Street SW
Washington, D.C. 20472
Telephone: (202)-646-4600
Media Desk Email: FEMA-News-Desk@dhs.gov
Website: http://www.fema.gov

Regional Offices

Region IV
-AL, FL, GA, KY, MS, NC, SC, TN-
Mary Hudak
3003 Chamblee Tucker Road
Atlanta, GA 30341
Telephone: (770) 220-5226
E-Mail: mary.hudak@dhs.gov

Region V
-IL, IN, MI, MN, OH, WI-
Jean Baker
536 South Clark St., 6th Floor
Chicago, IL 60605
Telephone: (312) 408-5515
E-mail: jean.baker@dhs.gov

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-AR, LA, NM, OK, TX-
Earl Armstrong
FRC 800 North Loop 288
Denton, TX 76209-3698
Telephone: (940) 898-5275
E-Mail: earl.armstrong@dhs.gov

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-IA, KS, MO, NE-
Brian Bowman
9221 Ward Parkway, Ste 300
Kansas City, MO. 64114-3372
Telephone: (816) 283-7080
E-Mail: brian.bowman@dhs.gov

Earthquake Media Contact Information

USGS Headquarters

12201 Sunrise Valley Drive
Reston, VA 20192
Telephone: (703)-648-4460
Media Desk Email: usgsnews@usgs.gov
Website: http://www.usgs.gov

Regional Offices

Eastern

-AL, CT, DE, DC, FL, GA, IL, IN, KY, MA, MD, ME, MI, MS, NC, NH, NJ, NY, OH, PA, PR, RI, SC, TN, VA, VI, VT, WI, WV-

12201 Sunrise Valley Drive
Reston, VA 20192
A.B. Wade
Telephone: (703)-648-4483
E-mail: abwade@usgs.gov

Central

-AR, CO, IA, KS, LA, MN, MO, MT, ND, NE, NM, OK, SD, TX, WY-

Box 25046 Denver Federal Center
Denver, CO 80225
David Ozman
Telephone: (303)-202-4744
Email: dozman@usgs.gov

Western

-AK, AZ, CA, HI, ID, NV, OR, UT, WA-

345 Middlefield Road
Menlo Park, CA 94025
Stephanie Hanna
Telephone: (206)-220-4573
E-mail: shanna@usgs.gov

Earthquake Media Contact Information

State Public Information Offices

Alabama

Public Information
Alabama Emergency Management Agency (AEMA)
5898 County Road 41
Clanton, AL 35046-2160
Telephone: (205) 280-2275
Website: http://ema.alabama.gov/

Public Information
Geological Survey of Alabama
420 Hackberry Lane
Tuscaloosa, AL 35486-6999
Telephone: (205) 247-3613
Website: http://www.gsa.state.al.us/

Arkansas

Public Information
Arkansas Department of Emergency Management (ADEM)
Building #9501 , Camp Joseph T. Robinson
North Little Rock, AR 72199-9600
Telephone: (501) 683-6700
Website: http://www.arkansas.gov/

Public Information
Arkansas Geological Survey
3815 West Roosevelt Road
Little Rock, AR 72204
Telephone: (501) 296-1877
Website: http://www.state.ar.us/agc/agc.htm

Illinois

Public Information
Illinois Emergency Management Agency (IEMA)
Room 611, Stratton Building
Springfield, IL 62706
Telephone: (217) 558-0546
Website: http://www.state.il.us/iema/

Public Information
Illinois State Geological Survey
Natural Resources Building-615 East Peabody Drive
Champaign, IL 61820-6964
Website: http://www.isgs.uiuc.edu/about-isgs/contact.shtml

Earthquake Media Contact Information

State Public Information Offices

Indiana

Public Information
Indiana Department of Homeland Security (IDHS)
302 West Washington Street, E-208
Indianapolis, IN 46204
Telephone: (317) 232-6632
Website: http://www.state.il.us/iema/

Public Information
Indiana Geological Survey
611 North Walnut Grove
Bloomington, IN 47405-2208
Telephone: (812)-855-7636
Website: http://igs.indiana.edu/

Kentucky

Public Information
Kentucky Division of Emergency Management (KyDEM)
100 Minuteman Parkway, Room 106
Frankfort, KY 40601
Telephone: (502) 607-1611
Website: http://kyem.ky.gov/

Public Information
Kentucky Geological Survey
228 Mining & Mineral Resources Bldg- University of Kentucky -Room 124
Lexington, KY 40506
Telephone: (859) 257-3896
Website: http://www.uky.edu/KGS/

Mississippi

Public Information
Mississippi Emergency Management Agency (MEMA)
1 MEMA Drive
Pearl, MS 39208
Telephone: (601) 933-6362
Website: http://www.msema.org/

Public Information
Mississippi Department of Environmental Quality
2380 Highway 80 West
Jackson, MS 39204
Telephone: (601) 961-5500
Website: http://www.deq.state.ms.us/MDEQ.nsf/page/Geology_home?OpenDocument

Earthquake Media Contact Information

State Public Information Offices

Missouri

Public Information
State of Missouri Emergency Management Agency (SEMA)
2302 Militia Drive
Jefferson City, MO 65101
Telephone: (573) 526-9136
Website: http://sema.dps.mo.gov/semapage.htm

Public Information
Missouri Department of Natural Resources
111 Fairgrounds Road
Rolla, MO 65402
Telephone: (573) 368-2118
Website: http://www.dnr.mo.gov/geology/index.html

Tennessee

Public Information
Tennessee Emergency Management Agency (TEMA)
3041 Sidco Drive
Nashville, TN 37204
Telephone: (615) 741-0482
Website: http://www.tnema.org/

Public Information
Tennessee Division of Geology
401 Church Street-13th Floor- L&C Tower
Nashville, TN 37243-0445
Telephone: (615) 532-1500
Website: http://www.state.tn.us/environment/tdg/

General Earthquake Information Resources

National Earthquake Hazards Reduction Program
http://www.nehrp.gov/

Federal Emergency Management Agency
http://www.fema.gov/

National Science Foundation
http://www.nsf.gov/

National Institute of Standards and Technology
http://www.nist.gov/

United States Geological Survey
http://www.usgs.gov/

Central United States Earthquake Consortium
http://www.cusec.org/

Center for Earthquake Research and Information
http://www.ceri.memphis.edu/

Mid-America Earthquake Center
http://mae.cee.uiuc.edu/

Earthquake Engineering Research Institute
http://www.eeri.org/